

RECORDS OF ANTHURIDS FROM FLORIDA, CENTRAL  
AMERICA, AND SOUTH AMERICA (CRUSTACEA:  
ISOPODA: ANTHURIDAE)

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*Abstract.*—Notes on morphology and new distributional records for *Apanthura magnifica* Menzies and Frankenberg, *Haliophasma curri* Paul and Menzies, *Malacanthura caribbica* Paul and Menzies, *Skuphonura laticeps* Barnard, and *Xenanthura brevitelson* Barnard are presented. *Skuphonura itapuca* new species, and *S. ecuadorensis* new species, are described.

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As part of a series of short contributions on anthurid isopod taxonomy, several scattered records in the Smithsonian collections from Florida, the Caribbean, Central and South America are combined prior to a generic revision of the group.

Family Anthuridae

*Apanthura magnifica* Menzies and Frankenberg

Figs. 1, 2

*Apanthura magnifica* Menzies and Frankenberg, 1966:40, fig. 17.—Schultz, 1969:99, fig. 134.—Kruczynski and Myers, 1976:353, figs. 1, 2.—Camp, Whiting, and Martin, 1977:15.

*Previous records.*—Off Georgia, 17–137 m; Off Florida, 7–11 m.

*Material examined.*—Gandy Shell Bar, Florida: 10 July 1966, 2 ♀; 1 Oct. 1966, 90 ♀, 43 juv.; 9 Nov. 1966, 27 ♀, 10 juv.; 14 Dec. 1966, 32 ♀, 10 juv.; 18 Jan. 1967, 36 ♀, 11 juv.; 12 Apr. 1967, 18 Apr. 1967 6 ♂ (7.5%) 80 ♀, +100 juv.; 17 May 1967, 8 ♂ (12.9%) 62 ♀, +100 juv.; 14 June 1967, 8 ♂ (6.4%) 47 ♀; 17 Aug. 1967, 66 ♀, 50 juv.; 20 Sept. 1967, 2 ♂; St Joseph Bay Florida, 22 ♀.

*Remarks.*—Kruczynski and Myers (1976) noted an immature (submale) stage in *A. magnifica*, characterized by the possession of a multiarticulate antennular flagellum, but lacking whorls of aesthetascs, and suggested that the species is protogynous as is *Cyathura*. The large sample from Gandy Shell Bar, Florida, illustrates the low percentage of males in this anthurid population. This sample also provides evidence of possibly two stages of immature male. The first is in all respects similar to the mature female, except for pereopod 1 which is identical with that of a mature male, with

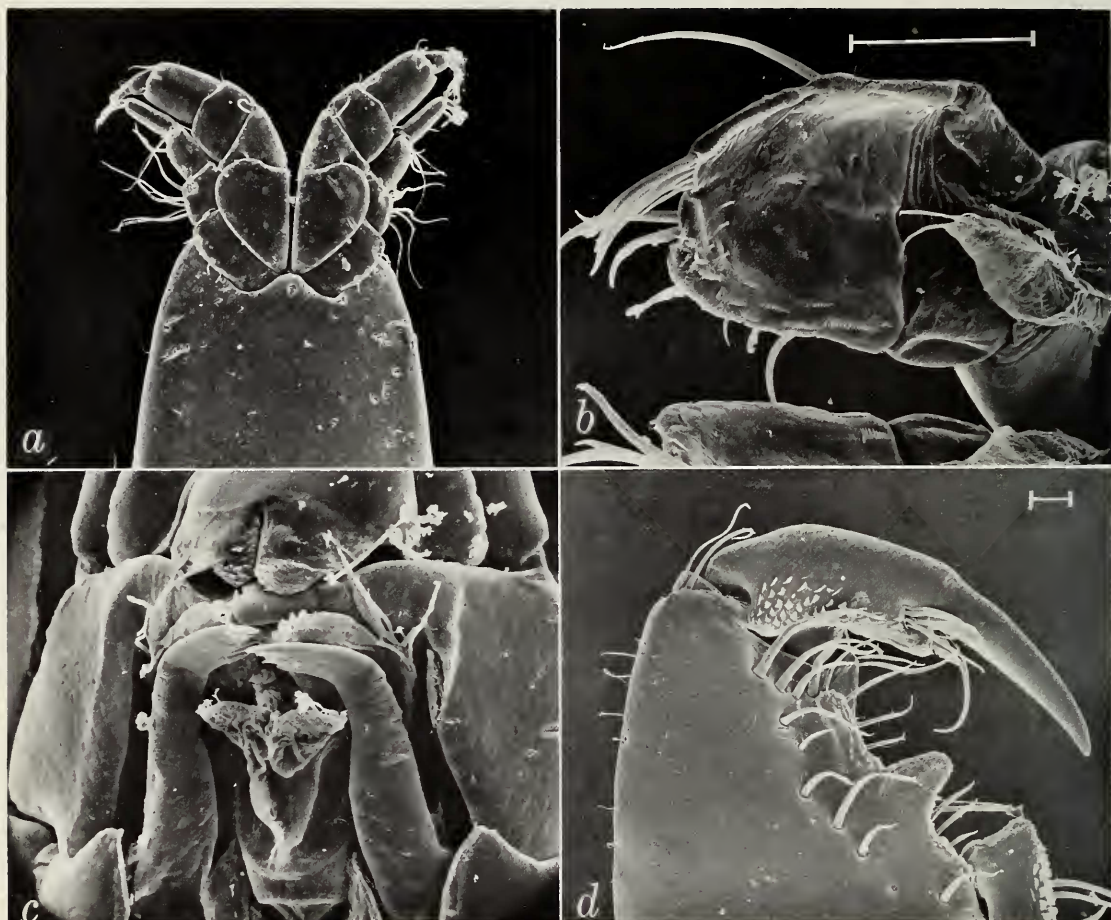


Fig. 1. *Apanthura magnifica*: a, Anterior cephalon in dorsal view; b, Inner view of maxilliped showing endite; c, Mouthparts in situ, maxillipeds removed; d, Pereopod 1, propodus and dactylus.

its more strongly developed palmar tooth and distal carpal process. The second submale stage shows both the typical male pereopod 1 as well as the multiarticulate flagellum of the antennule lacking aesthetascs. The endopod of pleopod 2 does not carry an appendix masculina. The mature male possesses both aesthetascs on the antennule as well as an appendix masculina on the second pleopod.

Kruczynski and Myers (1976) state that the basal antennal peduncular segment is grooved to accommodate the antennule. In fact, it is the second segment which is grooved.

Both Menzies and Frankenberg (1966), and Kruczynski and Myers (1976) figure the pleon of *A. magnifica* as having pleonites 1-3 free, and pleonites 4 and 5 partially fused. Clearing a specimen in lactic acid and chlorazol black, as well as scanning electron micrographs clearly show pleonites 1-5 to be fused, with sutures indicated laterally by slits, and with slight dorsal folds linking the lateral slits (Fig. 2a, b).



Fig. 2. *Apanthura magnifica*: a, Pleon and telson in dorsal view; b, Pleon in lateral view; c, Dorsal openings of statocysts at base of telson; d, Pereopod 7.

*Haliophasma curri* Paul and Menzies

Fig. 3i

*Haliophasma curri* Paul and Menzies, 1971:39, figs. 16, 17.—Poore, 1975:532.

*Previous records*.—Off Venezuela, Cariaco Basin, 11°03'N, 64°37'W, 95 m.

*Material examined*.—USNM 136418 Holotype ♀ TL 7.0 mm. USNM 136419 Paratype ♀ TL 7.0 mm. USNM 173520, ♀ TL 7.7 mm, Culebra Island, Bay of Panama, intertidal.

*Remarks*.—Poore (1975) mentions that the lack of dorsal pereonal grooves and pits, and the presence of a 5-segmented maxilliped (as given in the

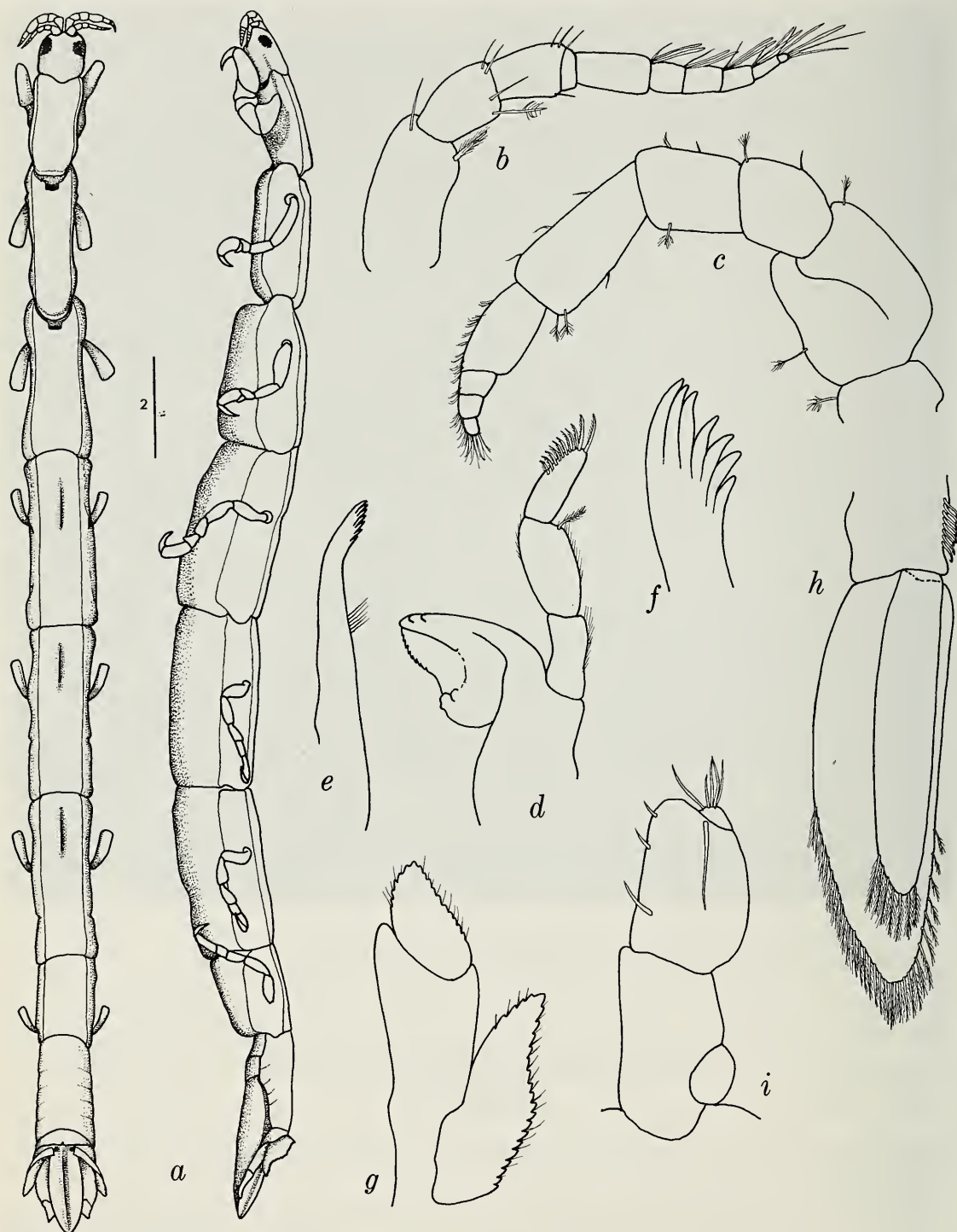


Fig. 3. *Malacanthura caribbica*: a, Adult ♀ in dorsal and lateral view; b, Antennule; c, Antenna; d, Mandible; e, Maxilla; f, Apex of maxilla; g, Uropod; h, Pleopod 1; i, *Haliophasma curri*: maxilliped.

original description) would exclude *H. curri* from *Haliophasma* s.s. as re-defined by him. Examination of the type-material and the Panamanian specimen shows that dorsolateral grooves are present (as they are in all anthurids), and that Paul and Menzies probably mistook a fold in the second maxillipedal segment for a suture. The maxilliped is 4-segmented and except for the presence or absence of dorsal pits on pereonites 4–6 (a difficult feature to see in such small and transparent specimens) *H. curri* fits Poore's definition of *Haliophasma*.

This second record of the species, from the Pacific side of the Panama Canal, raises the questions of earlier distributional patterns, and the movement of species through the canal, but gives little basis for fruitful speculation.

*Malacanthura caribbica* Paul and Menzies

Figs. 3, 4

*Malacanthura caribbica* Paul and Menzies, 1971:34, figs. 8, 9.

*Malacanthura cumanensis* Paul and Menzies, 1971:35, figs. 10, 11.

*Description.*—♀. Body 17 times longer than wide; integument moderately indurate. Cephalon half length of pereonite 1, with large eyes. Proportions:  $C < 1 < 2 = 3 < 4 = 5 = 6 > 7$ . Pereonites 2 and 3 with middorsal rectangular pit-like depression on anterior margin; pereonites 4–6 with longitudinal middorsal slit-like depressions. Pleonites 1–5 fused, segments faintly indicated ventrolaterally; pleonite 6 free, with middorsal notch in posterior margin. Telson strongly indurate, narrowly oval, with 2 basal statocysts and strong middorsal carina.

Antennular peduncle 4-segmented, 4th segment short; flagellum of 6 articles each bearing 2 aesthetascs. Antennal peduncle 5-segmented, 2nd segment longest and broadest, grooved to accommodate antennule; flagellum of 4 articles. Mandibular palp 3-segmented, terminal segment with 11 serrate spines; incisor with 3 cusps; molar reduced, rounded; lacinia with 8 or 9 serrations. Maxilla slender, with 7 distal spines. Maxilliped 5-segmented, 3rd segment with concave outer margin, 4th segment with row of 7 short serrate spines; scattered serrate spines on all segments as well as short fine setules. Pereopod 1 unguis one-third length of dactylus; propodus relatively narrow, palm bearing 4 or 5 slender spines and few setae, plus group of 4 spines distally near dactylar articulation. Pereopod 2 similar to pereopod 1. Pereopods 5–7 with unguis one-fifth length of dactylus; propodus with short triangular tooth at posterodistal corner; carpus half length of propodus, not underriding propodus, with posterodistal triangular spine. Pleopod 1 exopod operculiform, indurate, with dense plumose setae on distal margin; endopod half width and three-quarters length of exopod, with 7 distal plumose setae; basis with 8 retinaculae. Uropod strongly indurate, exopod with outer mar-

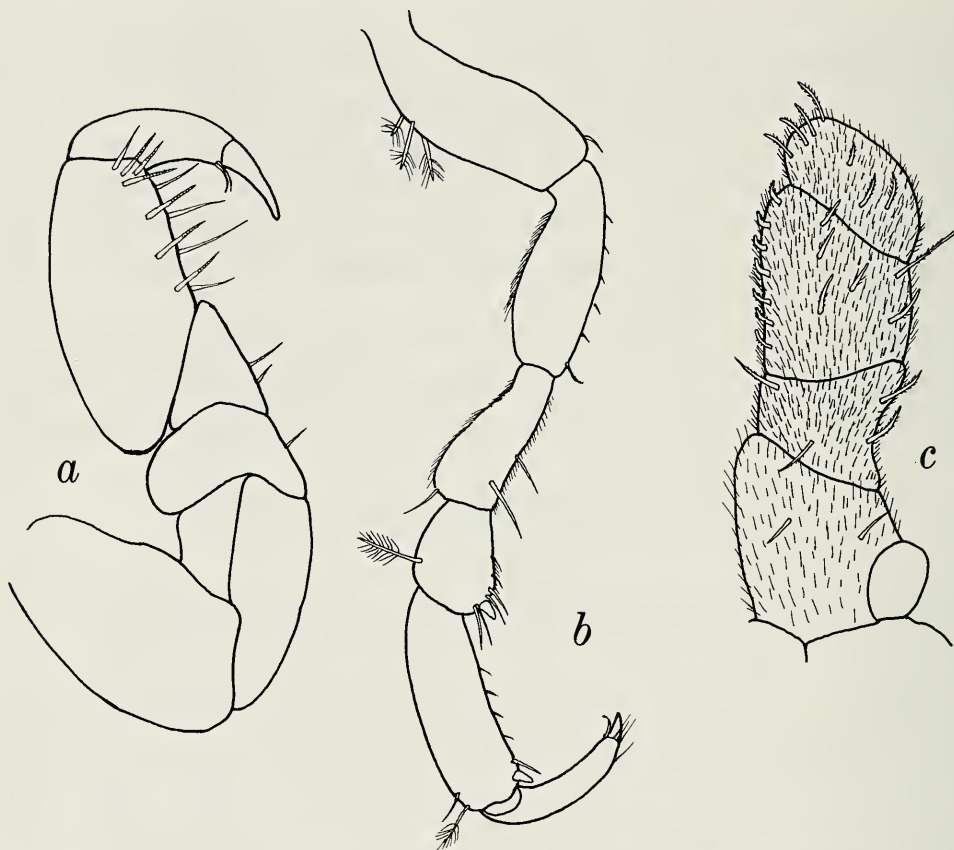


Fig. 4. *Malacanthura caribbica*: a, Pereopod 1; b, Pereopod 7; c, Maxilliped.

gin sinuate, apically subacute, margins with strong serrations, shorter than basis; latter with mediobasal corner somewhat produced, 3 times length of endopod; latter apically acute, margins strongly serrate.

*Previous records*.—Off Venezuela, 11°03'N, 64°37'W, 95 m.

*Material examined*.—USNM 136422, Holotype of *M. caribbica*, ♀ TL 17.0 mm. USNM 136423, Paratype of *M. caribbica*, ♀ TL 9.0 mm. USNM 136424, Holotype of *M. cumanensis*, ♀ TL 7.5 mm. USNM 173521, 3 ♀, TL 27.1 mm, 25.7 mm, 18.0 mm; off Cape La Vela, Colombia, 42–44 m.

*Remarks*.—The two large specimens from Colombia prompted re-examination of Paul and Menzies' two species of *Malacanthura*, both coming from the same locality off Venezuela. As all the above material shows very similar structure of the uropods and telson, mouthparts, and pereonites, it was concluded that only one species is involved here. Paul and Menzies separated *M. cumanensis* from *M. caribbica* by the former's lack of pigmentation, by maxillipedal structure, and by the lack of serrations on the uropodal exopod. With the exception of species of *Mesanthura*, pigmentation would seem to be an unreliable character for specific separation in the anthurids. Re-examination of the maxilliped and uropod showed that

what was taken for a sixth segment in the maxilliped of *M. caribbica* is an integumental fold in the fifth segment, and that transparent serrations are present on the uropodal exopod. Perhaps the most important feature common to all the specimens is the presence on pereonites 2 and 3 of a middorsal rectangular pit-like depression on the anterior margin, and middorsal slit-like depressions on pereonites 4–6. As the Colombian specimens are considerably larger than Paul and Menzies' type-material the above revised description is given.

*Skuphonura* Barnard 1925

*Diagnosis.*—Cephalon wider distally than proximally; anterolateral lobes extending beyond level of rostrum. Pleonites 1–5 fused, segments indicated ventrolaterally; pleonite 6 free, with middorsal slit in posterior margin. Some form of midventral tubercle or spine(s) at base of mouthparts. Flagella of antennae and antennules of single article in male and female; antennular flagellum in male with single tuft of aesthetascs. Pleopod 1 operculiform. Carpus of pereopods 4–7 triangular, underriding propodus. Pereopod 1 showing sexual dimorphism, carpus always distally produced into spinose process.

*Remarks.*—The genera *Mesanthura* and *Skuphonura* are very similar in the triangular underriding carpus of the posterior pereopods, in the 5-segmented maxilliped, and in the fusion of the pleonites. Two features, however, immediately separate them. The presence of a persistent pigment pattern in *Mesanthura* (absent in *Skuphonura*), and the uniaarticulate flagella of both antennae and antennules in *Skuphonura* (*Mesanthura* has flagella of more than one article).

*Skuphonura laticeps* Barnard

Fig. 5

*Skuphonura laticeps* Barnard, 1925:145, fig. 10.—Schultz, 1969:91, Figs. 115q, 119.

*Description.*—♂. Integument not indurate. Cephalon with rounded anterolateral lobes extending beyond level of triangular rostrum, bearing dorsolateral eyes each of 10 ocelli. Blunt rounded lobe at base of mouthparts. Proportions: C = 1 > 2 > 3 < 4 = 5 > 6 > 7. Pereonite 1 with strong forwardly-directed ventral spinose process. Telson widest at midlength, apically rounded, with broad transparent margin and several lateral and distal setae. Antennular peduncle 4-segmented, basal segment almost as long as 3 distal segments together; 4th segment short, set obliquely into 3rd segment; flagellum of single short article bearing cluster of aesthetascs. Antennal peduncle 5-segmented, distal segment equal in length to 3rd and 4th

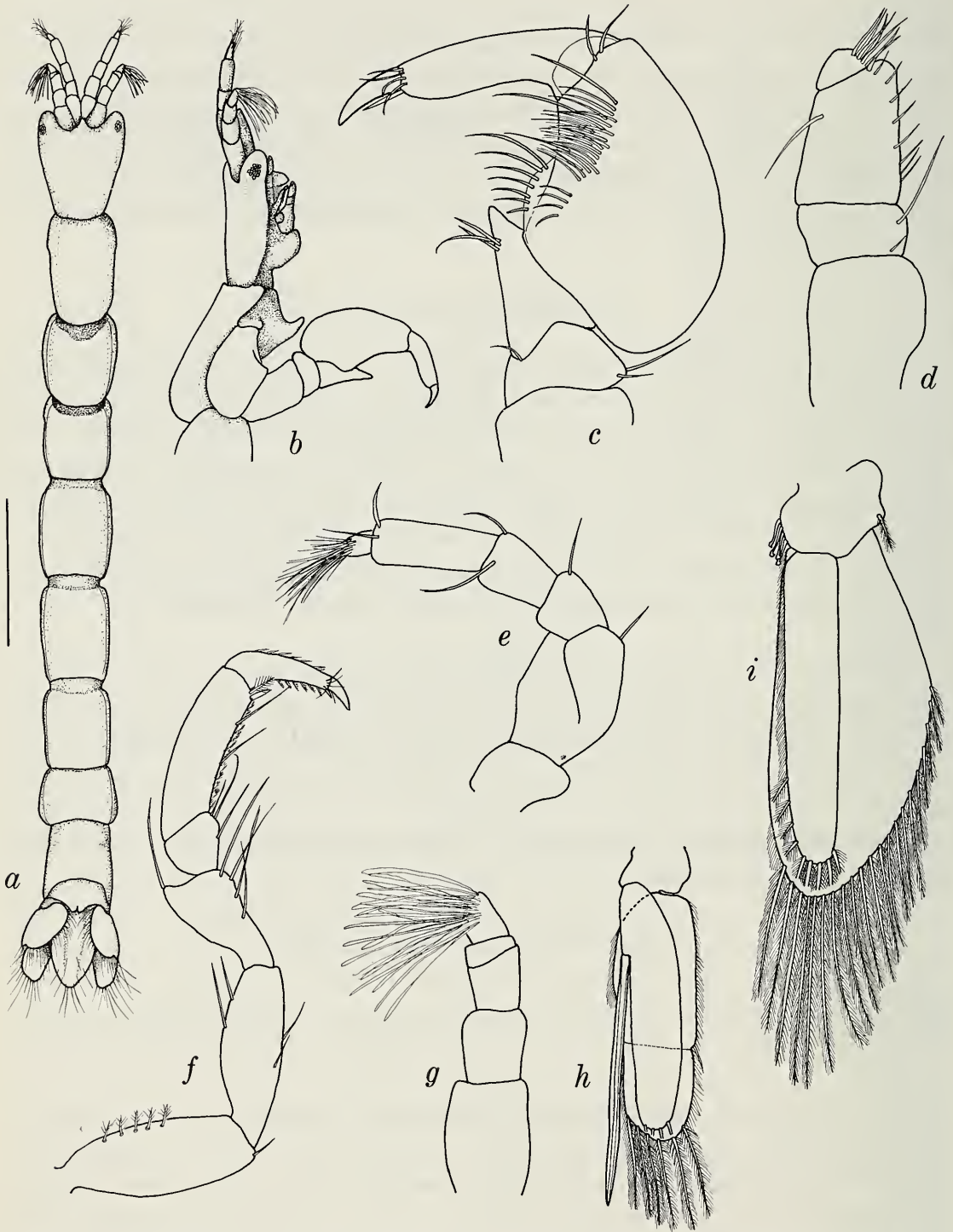


Fig. 5. *Skuphonura laticeps*: a, ♂ in dorsal view; b, ♂ Cephalon and pereonite 1 in lateral view; c, Pereopod 1♂; d, Maxilliped; e, Antenna; f, Pereopod 7; g, Antennule ♂; h, Pleopod 2♂; i, Pleopod 1.



segments together; flagellum article setose. Maxilliped 5-segmented, terminal segment short, obliquely set on penultimate segment, bearing 6 setae; 4th segment twice length of 3rd. Pereopod 1 unguis about one-third length of dactylus, latter with slight distal bulge at base of unguis; propodal palm concave, with numerous slender spines distally, membranous convexity proximally bearing 7 slender spines; carpus triangular, produced distally into narrowly triangular process. Posterior pereopods with carpus short, underriding propodus; propodus and dactylus bearing fringed scale-like spines on posterior margin. Pleopod 1 exopod operculiform, endopod slightly shorter and one-third width of exopod; basis with 4 retinaculae. Pleopod 2 endopod with straight apically acute appendix masculina, extending well beyond rami. Uropodal exopod oval, with distinct distal notch, fringed with setae; endopod almost reaching telsonic apex, distally rounded, bearing numerous setae.

*Type-material*.—Copenhagen Museum, syntypes 3 ♂, St. Thomas, West Indies, 8–40 m.

*Remarks*.—Barnard (1925) described this species from three males from St. Thomas in the West Indies, and one female from Tobago. The latter, however, has not been included in this discussion, as there is some doubt that it is the same species. The telsonic shape and the dactylus of pereopod 1 differs from the males, while in the two new species described below, the dactylus is similar in both species. The flagellum of the antennule in this female has two articles, while in both the new species the flagella are uniaarticulate. The female characters are thus omitted from the description of this species.

*Skuphonura itapuca*, new species

Figs. 6, 7

*Description*.—♂. Body proportions:  $C < 1 > 2 = 3 < 4 = 5 = 6 > 7$ . Cephalon anteriorly slightly wider than posteriorly; eyes present; lateral ridge well developed; medioventral toothlike process at base of mouthparts. Pereonites 4, 5, and 6 with faint proximal groove or constriction, becoming obsolete on pereonite 7 and pleon. Pleonites 1–5 fused, segments indicated ventrolaterally; pleonite 6 free, posterodorsal margin convex. Telson distally rounded, dorsally with slight proximal median ridge; 2 statocysts present; ventrally flattened.

Antennular peduncle 3-segmented, basal segment equal in length to 2 distal segments. Antennal peduncle 5-segmented, 2nd segment longest and widest, grooved to accommodate antennule. Mandibular palp 3-segmented, terminal segment about half length of middle segment, bearing 3 distal setae; incisor of 2 blunt cusps; molar of 2 rounded lobes, separated from incisor by 9-serrated lamina dentata. Maxilla slender, with 6 distal spines. Maxilliped

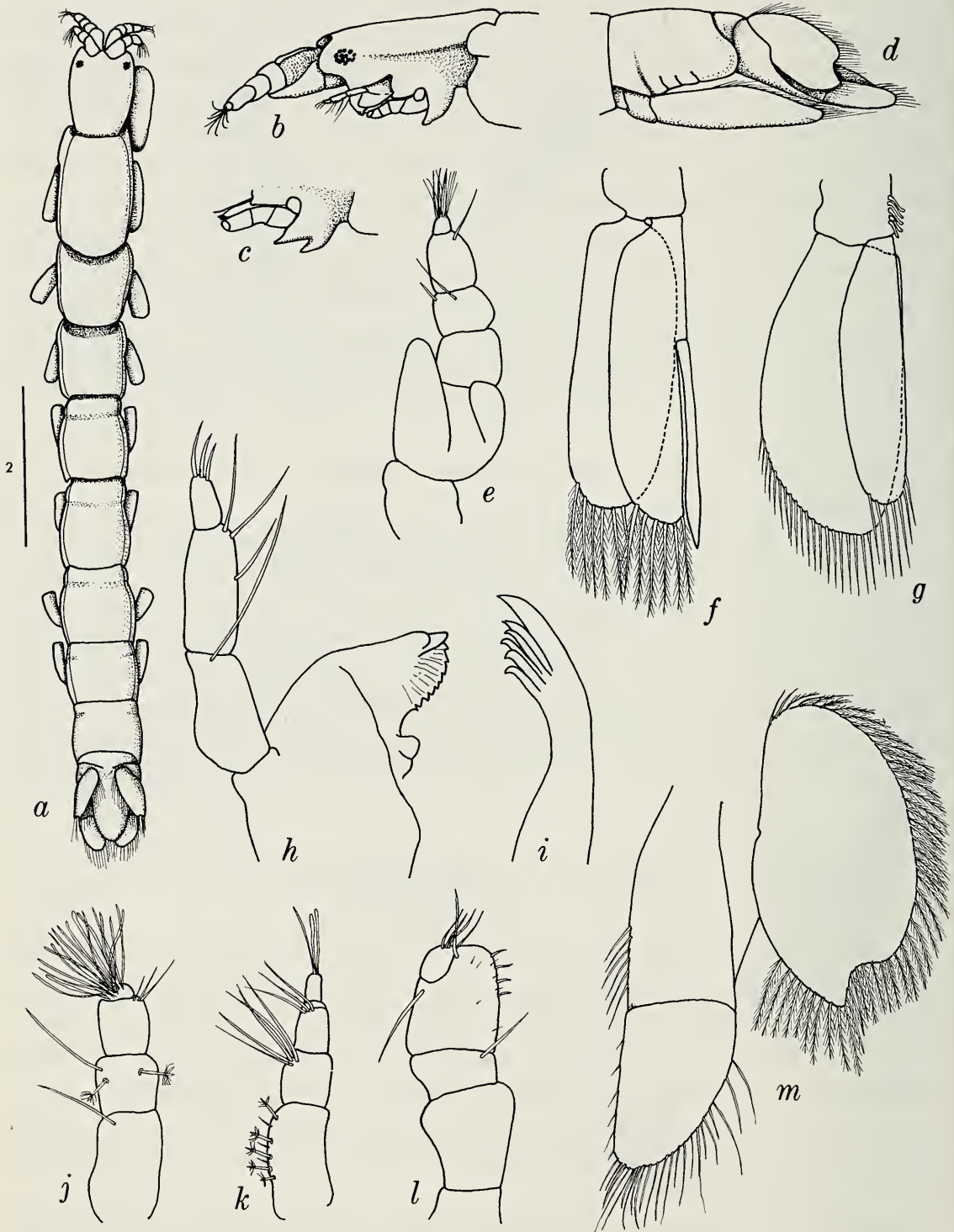


Fig. 6. *Skuphonura itapuca*: a, Holotype in dorsal view; b, ♂ Cephalon; c, ♀ Base of mouthparts; d, Pleon in lateral view; e, Antenna; f, Pleopod 2♂; g, Pleopod 1; h, Mandible; i, Maxilla; j, Antennule ♂; k, Antennule ♀; l, Maxilliped; m, Uropod.

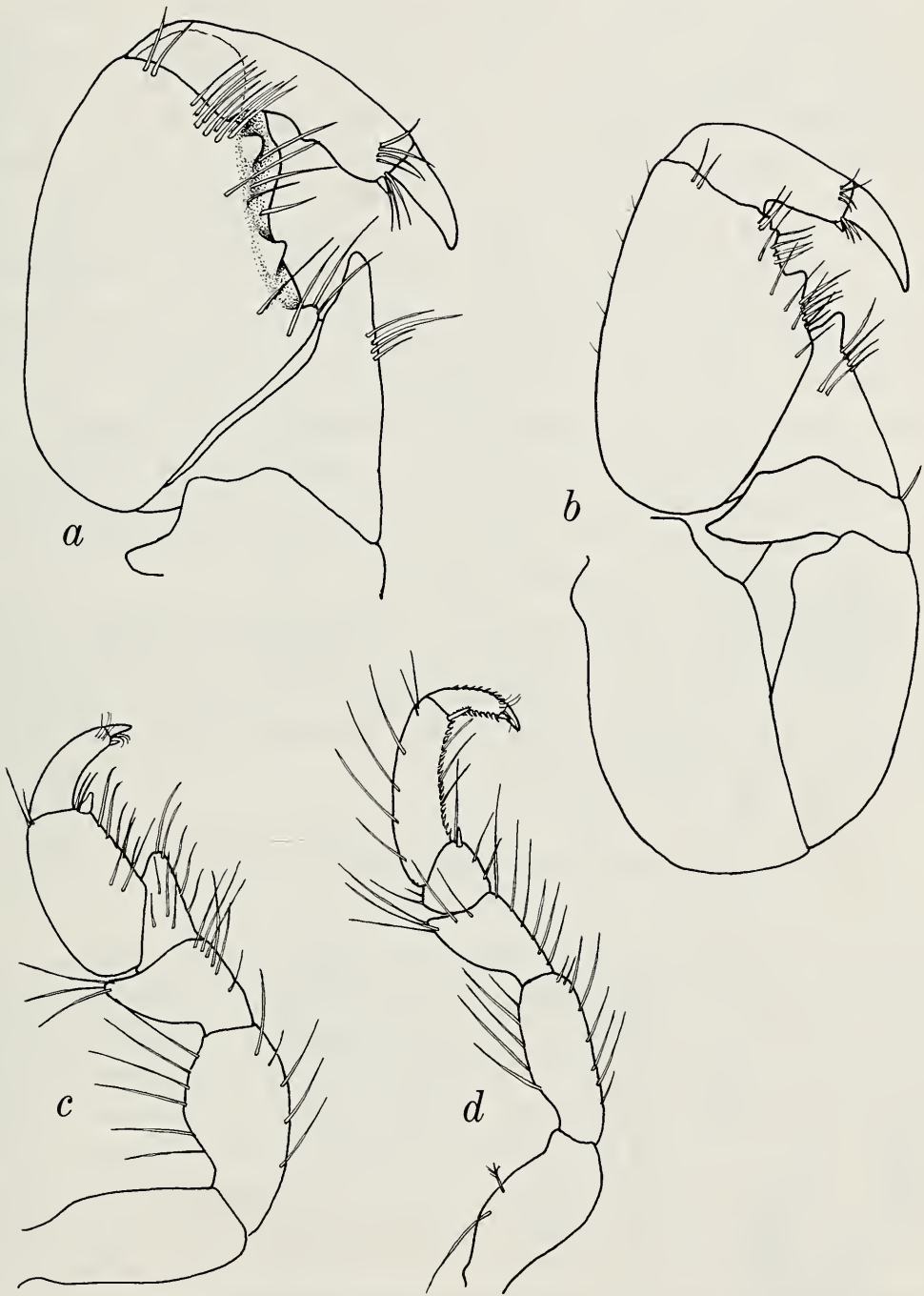


Fig. 7. *Skuphonura itapuca*: a, Pereopod 1♂; b, Pereopod 1♀; c, Pereopod 2; d, Pereopod 7.

5-segmented, outer margin of 3rd segment concave; distal segment short, inserted at outer angle of 4th segment. Pereopod 1 unguis one-third length of dactylus, with small spine at base; palm of propodus excavate, with 3 rounded tubercles on median edge, outer margin sinuous; carpus produced ventrodistally into narrowly triangular lobe. Pereopod 2 unguis one-quarter length of dactylus; propodus with short strong spine at ventrodistal corner;

carpus triangular, produced obliquely beneath propodus. Pereopods 4–7 dactylus with spinose scales; propodus cylindrical, with strong serrate spine at ventrodistal corner, ventral surface bearing short spinose scales; carpus triangular, underriding propodus, with strong ventrodistal spine; elongate setae on all segments. Pleopod 1 exopod operculiform, barely indurate, twice width and slightly longer than endopod; both rami with distal plumose setae; basis with 5 retinaculæ. Pleopod 2 endopod with stylet articulating at about midlength of median margin, slightly longer than ramus, distally broadened, apically acute; both rami with 6 distal plumose setae. Uropodal exopod slightly longer than basis, with distal notch, margin lined with plumose setae; endopod distally rounded, bearing simple setae.

♀. Medioventral process posterior to mouthparts with 2 strong toothlike spines. Antennular peduncle 4-segmented, segments 2 and 3 bearing elongate ventral setae; segment 4 short. Pereopod 1 propodal palm with median tooth and smaller distal tooth, proximal tooth not as developed as in ♂; carpus with ventrodistal triangular extension.

*Material examined.*—Nitheroy, Rio de Janeiro, Brasil, intertidal, collected by Dr. Waldo Schmitt in 1925. USNM 173522, Holotype ♂ TL 8.9 mm. USNM 173523, Allotype ♀ TL 9.3 mm. USNM 173524, Paratypes 9 ♀, 3 juveniles.

*Etymology.*—The specific name derives from the name of the beach at which the specimens were collected.

*Skuphonura ecuadorensis*, new species

Figs. 8, 9

*Description.*—♂. Integument indurate, brittle. Body proportions:  $C < 1 > 2 > 3 < 4 = 5 > 6 > 7$ . Cephalon broader distally than proximally, with anterolateral corners lobe-like and rounded, extending well beyond rostrum, bearing eyes of 6 or 7 small ocelli; lateral margin of cephalon forming a rounded ridge; small medioventral rounded tubercle posterior to mouthparts. Pereonites 4–6 with faint proximal constriction. Pleonites 1–5 fused, segments indicated ventrolaterally by short slits; pleonite 6 free, with mediodorsal slit in posterior margin. Telson lanceolate, ventrally flattened, dorsally with proximal area raised to rounded median ridge, spreading from about midlength to broad area sloping to rounded apex.

Antennular peduncle 3-segmented; flagellum of single article bearing cluster of filiform aesthetascs. Antennal peduncle 5-segmented, second segment longest and broadest, grooved to accommodate antennule; flagellum of single setose article. Mandibular palp 3-segmented, terminal segment one-third length of 2nd, with 3 distal setae; 1st and 2nd segments with elongate setae; incisor of 2 rounded cusps; molar of 3 rounded teeth; lamina dentata with 10–11 serrations. Maxilla slender, with 6 distal spines. Maxilliped 5-segmented, terminal segment situated at outer distal corner of 4th segment, 3rd segment

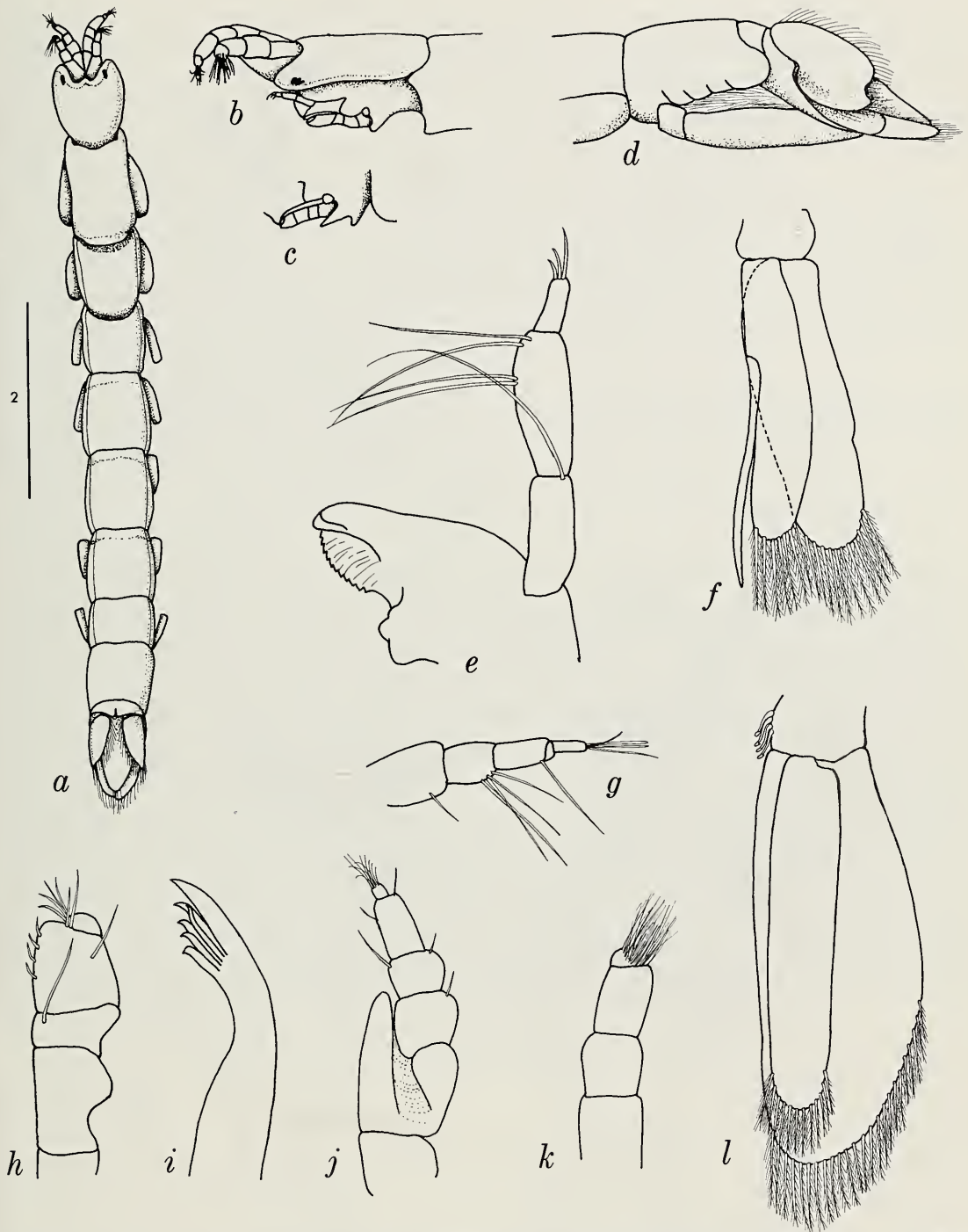


Fig. 8. *Skuphonura ecuadorensis*: a, Holotype in dorsal view; b, Cephalon ♂; c, ♀ Base of mouthparts; d, Pleon in lateral view; e, Mandible; f, Pleopod 2♂; g, Antennule ♀; h, Maxilliped; i, Maxilla; j, Antenna; k, Antennule ♂; l, Pleopod 1.

with concave outer margin. Pereopod 1 unguis one-third length of dactylus, with small supplementary spine and slight proximal concavity on ventral margin; propodal palm concave, with small distal and large proximal tooth-like tubercle; carpus distally narrowed into blunt tubercle. Pereopod 2 un-

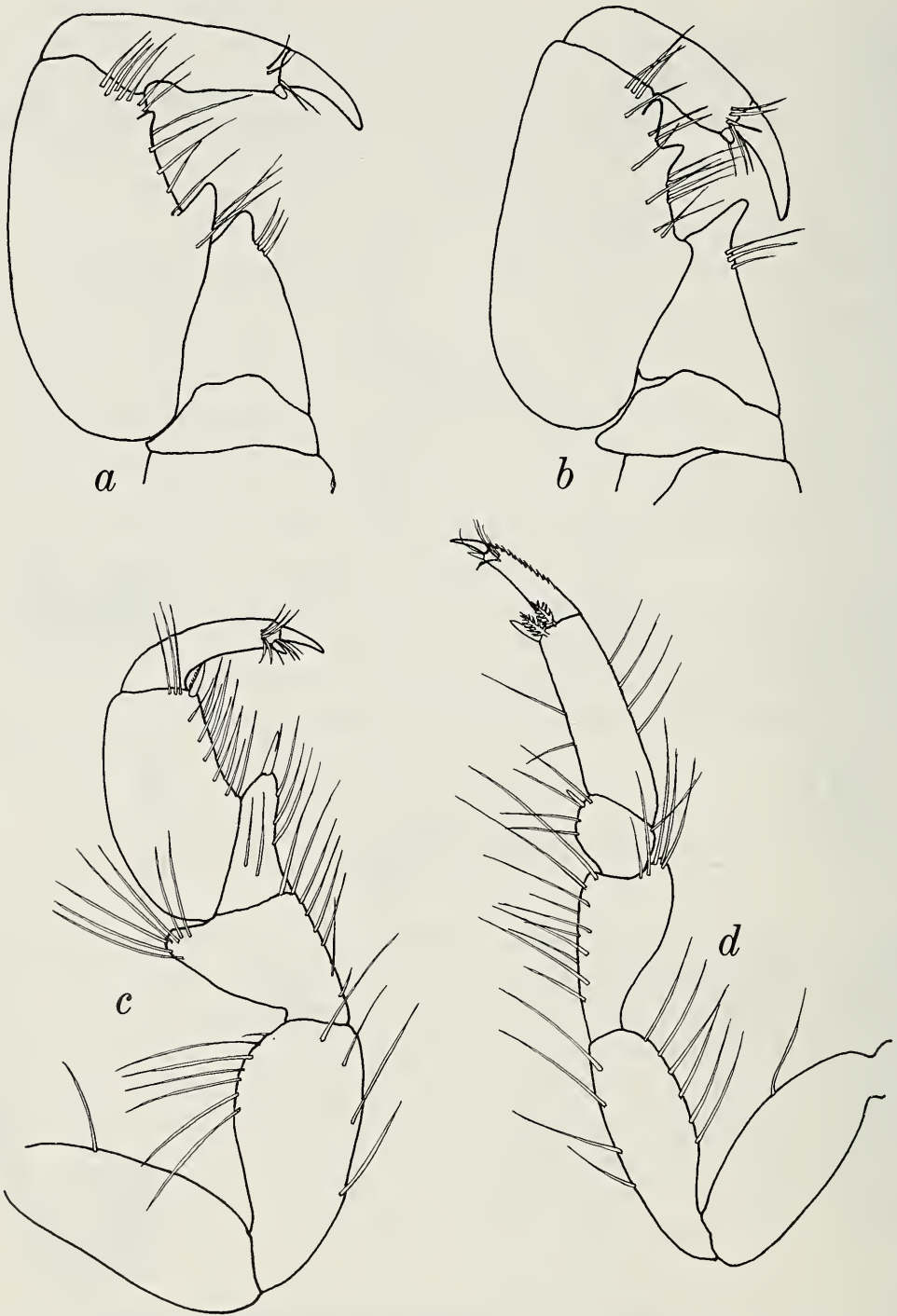


Fig. 9. *Skuphonura ecuadorensis*: a, Pereopod 1♂; b, Pereopod 1♀; c, Pereopod 2; d, Pereopod 7.

guis one-quarter length of dactylus; propodus with several ventral setae, strong spine at ventrodistal corner, serrate on one edge; carpus triangular, with sensory spine distally; merus and ischium bearing elongate setae. Pereopods 5–7 dactylus bearing short fringed scales; propodus cylindrical, with ventrodistal spine, serrated on one margin, and 2 spines serrated on both

margins; carpus short, underriding propodus; all segments with several elongate setae. Pleopod 1 exopod operculiform; endopod shorter than and slightly less than half width of exopod; both rami bearing distal plumose setae; basis with 4 retinaculae. Pleopod 2 copulatory stylet on endopod extending beyond rami, distally acute. Uropodal exopod with distal notch, fringed with plumose setae, not quite reaching endopod.

♀. Medioventral process posterior to mouthparts consisting of 2 tubercles. Antennular peduncle 4-segmented, 4th segment very short; flagellum of single article bearing 2 aesthetascs and few simple setae. Pereopod 1 with 2 toothlike tubercles on distal half of propodal palm; triangular carpus produced distally into toothlike projection.

*Material examined.*—La Libertad, Ecuador, intertidal. USNM 173525, Holotype ♂ TL 7.2 mm. USNM 173526, Allotype ♀ TL 7.2 mm. USNM 173527, Paratypes ♀ TL 7.2 mm, 2 juveniles.

*Etymology.*—The specific name derives from the country of origin of the species, viz. Ecuador.

*Remarks.*—*Skuphonura itapuca* and *S. ecuadorensis* seem to be closely related, judging from the many structural similarities, including the midventral cephalon process of the female, the antennules, antennae, mouthparts, pereopods 2–7, pleopods, and uropods. The main differences lie in the first pereopods of both the male and female, which show subtle differences in the size and placing of the toothlike tubercles of the propodal palm and carpus, the midventral cephalon process in the male, and the outline of the cephalon seen in dorsal view. *S. ecuadorensis* is markedly broader distally and the anterolateral lobes are more produced than in *S. itapuca*. The relationship between the 3 species of *Skuphonura* is difficult to assess. It is possible that a single species was distributed over the Caribbean-Central American region before the final emergence of the isthmus of Panama. Subsequent geological and hydrological events could have led to the isolation of 3 populations, giving rise to the present species.

The major differences between the 3 species are summarized in the following table.

	<i>S. laticeps</i>	<i>S. itapuca</i>	<i>S. ecuadorensis</i>
Pereopod 1♂	Carpus well produced Propodus with low convexity	Carpus well produced 3 short propodal spines	Carpus slightly produced Propodus with 1 large and 1 small spine
Pereopod 1♀	— —	Carpus slightly produced Propodus with large proximal and small distal spine	Carpus well produced Propodus with 2 distal spines



Fig. 10. *Xenanthura brevitelson*: a, Mouthparts in situ; b, Antennule showing robust sensory seta; c, Reduced mandibular palp; d, Pereopod 1.

Midventral cephalon process	♂ single, blunt	♂ single, conical	♂ single, blunt
	♀ —	♀ 2 conical spines	♀ 1 conical spine, 1 blunt tubercle
Pereonite 1	Strong medio-ventral spine	Spine lacking	Spine lacking

*Xenanthura brevitelson* Barnard

Fig. 10

*Xenanthura brevitelson* Barnard, 1925:138, fig. 8.—Nierstrasz, 1941:240.—Pillai, 1963:263.—Menzies and Frankenberg, 1966:38, fig. 15.—Schultz, 1969:92, fig. 122.—Camp, Whiting, and Martin, 1977:16.



*Previous records.*—St. Thomas, West Indies, 50–60 m; Off Georgia, 20–145 m; Off Florida, 8–10 m.

*Type-material.*—The type-material of *X. brevitelson* from the Copenhagen Museum, collected by T. Mortensen, consists of three vials, each labelled 'Type'. One vial has a pencilled note in K. H. Barnard's autograph, a second has an inked label also in Barnard's autograph. North East of Hans Lollik (North of St. Thomas) 8 March 1906, Syntypes, 3 ♂, 1 sub ♂, 24 ♀, 5 juveniles. North East of Hans Lollik (North of St. Thomas) 50–60 m, 8 March 1906, Syntypes, 1 sub ♂, 8 ♀, 6 juveniles. St. Thomas, West Indies, 50–60 m, Syntypes 3 ♂ 3 ♀.

*Remarks.*—Figure 10b shows what Barnard (1925) mistook for a second flagellum on the antennule to be a large sensory seta, as was suggested by Menzies and Frankenberg (1966).

The presence amongst the syntypes of two submales with elongate antennules lacking aesthetascs along with fully mature males, suggests that *X. brevitelson* is another anthurid which displays protogyny, and that at least two molts are involved in the change from female to male.

#### Acknowledgments

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